METHODS

Sampling Design

Since 2000, Montana's BRFSS sample has been stratified based on county population size and proportion of American Indians, Montana's largest minority population. Stratum I consists of seven counties containing a high proportion of American Indians, Stratum II consists of 41 counties with relatively low population size and low proportion of American Indians, and Stratum III consists of eight counties with relatively high population size and low proportion of American Indians. These three strata allow the potential for oversampling households of American Indians and are used strictly for sampling, rather than analytical purposes. In 2002, CDC began the Selected Metropolitan/Micropolitan Area Risk Trends (SMART) BRFSS in order to analyze the data from selected metropolitan and micropolitan statistical areas (MMSAs) with 500 or more respondents. The Montana BRFSS, therefore, added a fourth stratum in 2004 that includes Yellowstone and Carbon Counties – Billings, Montana's largest MMSA[1]. In the future, Montana BRFSS hopes to expand the sampling of other MMSAs for the state that will allow for refinement of state-level estimates to more narrowly focused statistical areas. Also, beginning in 2003, Montana's dataset has been weighted for regional analyses based on the state's five health planning regions for regional health information and public health planning purposes (see Appendix B for map of health planning regions). Appendix C contains a summary of selected 2004 health indicators for the nation, state, MMSA and health planning regions in Montana.

In 2004, Montana used a disproportionate stratified sampling design (DSS)[2] for the BRFSS survey. In the DSS design, the universe of all Montana telephone numbers was disproportionately stratified by telephone blocks. Beginning in 2003, the CDC protocol for selecting household telephone numbers discontinued the inclusion of "0" blocks in the sampling frame; "0" blocks are computer generated listings of 100 consecutive phone numbers that contain *no* published household telephone numbers. A block consists of 100 phone numbers with consecutive four-digit telephone suffixes (e.g., 406-443-1100 to 406-443-1199). Now, only "1+" blocks are sampled; these are also computer generated listings of 100 consecutive phone numbers, but they contain *at least one* published household telephone number. These "1+" blocks are then assigned to two strata: 1) high density or listed numbers and 2) low density or unlisted numbers. To be representative, the sampling ratio for these two strata is 1.5:1, in which the high density stratum (listed) is sampled at the rate of 1.5 times that of the low density stratum (unlisted). This approach has served to lower cost and improve interviewer efficiency.

Once a residence was successfully contacted, individual respondents were randomly selected from all adults aged 18 and older living in the household. The selected adult was then interviewed in accordance with the BRFSS protocol (CDC 2006). In 2004, approximately 418 interviews were completed each month, for a yearly total of 5005 interviews.

Interviews were conducted by Macro International, Inc. with headquarters in Burlington, Vermont. Interviews were conducted during daytime and evening hours on Monday through Friday and on weekends to ensure that selected individuals had ample opportunity to participate in the survey. Fifteen efforts were made to reach a phone number at different times of the day and evening and on different days before being classified as an unreachable number. The Council of American Survey Research Organizations (CASRO) response rate, which includes a portion of the dispositions with unknown eligibility in the denominator of the rate, for Montana in 2004 was 56.1 percent. Of all contacted selected respondents, 74.3 percent resulted in completed interviews

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[1] These geographic subdivisions are designated by the U. S. Office of Management and Budget and used by the U. S. Census Bureau as of June 2003. See http://www.cdc.gov/brfss/smart/faqs.htm#2 for frequently asked questions and answers about SMART BRFSS and MMSAs.

[2] For a detailed description of BRFSS methodology, see the BRFSS User's Guide, an online version at: http://www.cdc.gov/brfss/training.htm

(cooperation rate). At least 10 percent of all interviews were monitored and validated by the quality assurance section of the call center, using the system's monitoring function to observe and score interviews in progress for quality improvement purposes.

Data Weighting and Analysis

Data were weighted to account for differences in the probability of selection due to the disproportionate sampling method and due to households with different number of adults and different numbers of telephones (e.g., households with more than one telephone number were more likely to be called). Post-stratification weighting, based on the sex and age distribution of the 2004 Montana adult population, was used to ensure that the results more closely reflected the adult population of Montana. The demographic characteristics of the 2004 survey respondents are presented in Table 2.

INSERT HERE: [Table B. Demographic Distribution of Montana Adults in the 2004 Behavioral Risk Factor Surveillance System (BRFSS) Survey]

This table presents for the 2004 survey, the unweighted number of respondents, the unweighted percent of respondents, and the weighted percent of respondents by selected demographic characteristics. Respondents who indicated "don't know," "not sure," or "refused" were excluded from the calculation of prevalence estimates. Therefore, the sample sizes used to calculate the estimates in this report vary. The SPSS for Windows Complex Survey Samples™ statistical software package was used to compute prevalence estimates (expressed as percentages) and associated 95% confidence intervals using sample weights provided by CDC. Prevalence estimates based on denominators with fewer than 50 respondents or half-width confidence intervals greater than 10 percent were not reported due to their inherent low precision.

Data Reliability and 95% Confidence Intervals

As noted previously, the BRFSS data provides a disproportionate stratified statewide random sample of telephone-equipped households in Montana. The precision of a sample statistic (e.g., prevalence) can be estimated by calculating the confidence interval of the statistic; 95% confidence intervals (CI) are presented with the prevalence estimates in this report.

As an example, a prevalence estimate for cigarette smoking of 20 percent with a computed 95% confidence interval of ∀2%, translates to a lower limit of 18 percent and an upper limit of 22 percent. We are 95% confident that the interval 18% to 22% includes the true percentage of smokers in the Montana population.

The width of a confidence interval (e.g., ∀ 2%) is dependent upon sample size. Estimates based on large samples have narrower confidence intervals and are more precise than are estimates based on small samples. Confidence intervals must be considered when making comparisons among subgroups of the population (e.g., among age classes). Percentages for different subgroups of the population can be determined to be significantly different if their confidence intervals do not overlap. A statistical test is needed to determine if estimates are different when the confidence intervals overlap.

Analysis of subpopulations results in a concomitant lowering of sample size. The more subgroups into which the data are partitioned, the smaller the sample size per subgroup. The results include some instances where sample sizes for subgroups within select populations are too small (e.g., had a flu shot in the past year for respondents 65 years of age and older by race), or the associated 95% confidence intervals too broad, to yield meaningful comparisons.

Questionnaire

The BRFSS questionnaire has three parts:

1) the core, consisting of the fixed core questions (asked every year), rotating core questions (asked in alternating years), and emerging core questions (asked for only one year);
2) optional modules provided by CDC, any number of which can be selected by individual states for inclusion; and
3) state-added questions (additional questions of specific interest to individual states).

All states must ask the core questions without modification in wording. As part of the core, respondents are asked to provide demographic information including sex, age, race, marital status, annual household income, employment status, and education level. Optional modules and state-added questions may be added by individual states to their respective questionnaires. Montana's BRFSS Working Group, consisting of state data analysts and users, helps to establish the state questionnaire content each year using the "Criteria for Adding Questions to the MT BRFSS," which can be found at the Montana BRFSS website: www.brfss.mt.gov.

The 2004 Montana BRFSS questionnaire consisted of 174 questions. Not all respondents were asked all questions, since some questions pertained to a specific age group or sex or persons with a particular condition (e.g., diabetes). The average length of time to complete the survey was 22 minutes in 2004.

Survey Limitations

Surveys that require self-reporting of data have limitations and should be interpreted with caution. Respondents may have a tendency to under-report behaviors that are socially undesirable, unhealthy, or illegal (e.g., drinking and driving or smoking), while over-reporting desirable behaviors (e.g., amount of exercise or regular health screening). The accuracy of self-reported information also is affected by the ability of respondents to fully recall past behaviors or health screening results.

Telephone surveys exclude households without telephones, which may result in a biased survey population due to under-representation of certain segments of the population. In 2004, an estimated 96 percent of Montana households had at least one residential telephone. The four percent of homes without telephones may have represented a population segment at high risk for preventable diseases associated with low socioeconomic status. The 2004 sampling procedures made no special effort to reach populations without landline telephones.